

Discovering Metacognitive Approaches to Personal Finance with Intelligent Tutoring Systems

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ABSTRACT

One of the most difficult challenges that young people are currently facing in today's world is to make the right financial decisions in their daily life properly due to the lack in personal finance or has developed a poor financial behavior. In order to make the proper financial decisions, they would need to have the ability to maintain their thought process and habits around their personal finances. By leveraging the intelligent tutoring system (ITS) with the model from Carnegie Mellon University, we can help young people to improve their metacognitive capabilities to make better personal financial decisions.

The intention of this paper is to help ease the transition to further the research and development of the intelligent tutoring system for personal finance in which it enables to help young individuals to develop and improve their metacognitive skills that can have a long-lasting impact on their decision-making for personal financial and for many future generations to come.

Author Keywords

Metacognition, Personal Finance, Financial Education, ITS, Intelligent Tutoring System.

ACM Classification Keywords

K.3.1: Computer Uses in Education, H.5: Information Interfaces and Presentation (HCI)

INTRODUCTION

As the population and economy grows, the younger generations will be living in a more complex world, which is similarly to where we all have faced financial crisis since the last few decades. Based on research, Parents and teachers believe that young millennial should learn how to budget and make wise financial choices for everyday living, and poor financial decisions can have a long-lasting impact on individuals and society as a whole [6]. Also, they'd want to make the future generations to become more financial literate.

With that being said, research raised that financial education can make a difference because they believe that developing the skills to help choose and make better financial decisions, including knowing how to manage finances properly [6]. With the given statistics, many young adults in the United States are facing financial crisis due to the following issues [3]:

- Increase of credit card debt
- Misuse of credit cards
- Lack of savings for retirement
- No proper blue-print to save money
- Refuse to start investing early
- Failing to define personal and life goals
- Lack of financial literacy
- Financial fragility
- Making poor investments

Many teachers from school have recognized that there's a need for personal financial education. However, fewer teachers are teaching financial topics and very few students are gaining the experience and exposures due to the lack of availability for financial education lessons or even the opportunity to developing curriculums on financial education. Furthermore, fewer teachers are acquiring very little formal education in personal finance to teach and it's a significant predictor of their inadequacy to teach personal finance topics to students [7].

Table IV.8 - College-Level Financial Education Coursework Reported by Respondents		
Course Title	N	Percent ^a
Macro/Microeconomics	135	27.8
Consumer Economics	51	10.1
Personal/Consumer Finance	44	8.8
Finance and Investments	33	6.6
Consumer Education	29	5.8
Family Economics	25	5.0
Consumers and the Market	21	4.2
Risk and Insurance	18	3.6
Family Resource Mgt.	14	2.8
Methods of Teaching Per.Fin.	13	2.6
Other (e.g., accounting)	6	1.2

Figure 1. College Level Financial Education from Teachers [7].

Given the data shown above, most teachers have only taken macroeconomics and microeconomics, which is nowhere close to the learning materials about personal finance. In addition, there are not a single course listed anything related to personal finance on the list. This shows that most teachers are inadequate to teach personal finance. Also, it's not only teachers not having the opportunity to learn and teach personal finance. It's also the fact that different generations of students who have gone to college never

have taken a personal finance course and the chance of being able to take a course related to it is very slim.

	N	Percent
Knowing whether I will have enough money for retirement	246	48.9
Determining ways to supplement my income as a teacher	205	40.8
Paying for my children's college/university education	198	39.4
Whether I am using the best strategies for investing my money	191	38.0
Whether I am taking advantage of all the tax laws that benefit me	179	35.6
Not having sufficient income to meet my needs	170	33.8
Whether I am making the best use of employer-sponsored savings or investment plans	139	27.6
My level of credit card debt	134	26.6
Understanding insurance options and costs during retirement (e.g. private insurance, employer-sponsored insurance, Medicare)	130	25.9
Developing an estate plan (e.g. wills, trusts, gifts)	129	25.7
Knowing which sources of financial information to trust	125	24.9
Understanding the role of social security in my likely retirement income	125	24.9
Covering the cost of my continuing education requirements	123	24.5
Paying of my college/university loans	115	22.9
Being able to develop and follow a realistic spending plan	106	21.1
Having funds to buy a home and meet my mortgage payments	106	21.1
Understanding and selecting long-term care insurance	96	19.1
Understanding and selecting personal/family health insurance coverage	78	15.5
Understanding and selecting the most appropriate life insurance option(s) for me and my family	69	13.7
Finding the best property and automobile insurance products to meet my needs	60	11.9
Whether I am getting the best rate when buying on credit	58	11.5

Figure 2. Teacher's Personal Financial concerns [7].

The above data shows that teachers have their own concerns of being able to have enough money for retirement and finding other sources to supplement their income as a teacher. That means if teachers aren't expert in their financial outcomes, how could they have the knowledge and expertise to teach students about this subject matter if they're aren't improving it themselves?

Construct/indicator	Standardized factor loading	Scale reliability (α)
Parent SES		NA
SES	1.00 ^a	
Parent financial behaviors		.88
Track monthly expenses	.59	
Spend within the budget	.69	
Pay credit card balances in full each month	.75	
Save money each month for the future	.90	
Invest for long-term financial goals regularly	.88	

Figure 3. Influential based on Financial Behaviors [5].

The above data shows that most people's financial behaviors were influenced their parent's financial behavior. Not everyone's financial behavior's are the same and can be altered by strengthening their metacognitive skills, such as learning different strategies and creative ways to learn and knowing why and when to use a specific strategy.

With that being said, there are opportunities to help young adults to make the proper financial decisions. These opportunities were discovered throughout research and prototyping via surveys with analysis, interviews, and low-fidelity prototype along with feedbacks from these young adults that we have collected data and in-depth information via survey and interview. After the research and prototypes with constant feedback, it can be utilized for a future work of development with a continuous feedback loop. Ultimately, with these information gather from research and the process to fully develop an intelligent tutoring system (ITS) specifically for personal finance, the goal is to bring effective metacognitive approaches that people can develop the skills and knowledge to make better financial decisions.

WHAT IS METACOGNITION?

Before who go too far ahead, what is metacognition? Metacognition improves cognitive performance in wide ranges of activities, such as reading, learning, decision-making, search and social interactions [4]. In my research, I only focus on learning and decision-making aspect of metacognition to make better financial decisions with young adults at scale. Therefore, it brought me to this curiosity to understand young adults behavior in their financial decision-making, and figuring how intelligent tutoring systems (ITS) can cope with helping individuals to improve their metacognitive skills so that they can make better financial decisions.

MOTIVATION AND OBJECTIVES

Since there's awareness that there are needs for personal financial education for young adults so that they can make the proper personal financial decisions, it requires one having the knowledge and implementing the knowledge.

Becoming financial literate and gaining the knowledge through financial education is just not enough. Research believe that in addition to gaining the financial educational knowledge, one needs to have an active positive financial consistently in order to become successful with their personal finances throughout their life time. Unfortunately, not everyone has the same behavior with money management because young adults who begin to learn about money during adolescence and the environments they grew up in gave them the best chance for success in their personal finance [5]. Because the reason why many young adults are facing high financial risk due to their lack of self-awareness, knowledge, and financial behaviors, they're not able to make the right financial decisions on their own and everyone is at a different mindset with their finances.

With that being said, the proposed solution is to teach students and young adults from universities by improving their metacognitive skills so that they become self-sustaining, identifying the right investing strategies, keeping budgets with savings, and monitoring and self-regulating their financial behaviors. It also allows people to become more self-aware that they could alternate their behavior decision-making on their finances [1]. Everyone

process information in a different way, which affects each individual's approach their personal financial decisions differently, and poor decisions can lead to poor financial results. Therefore, my research's goal is to be able to teach students and improve their metacognitive skills using an intelligent tutoring system (ITS), specifically for personal finance, that allows them to learn, plan, monitor, as self-regulate as they strengthen their metacognitive behaviors.

Problem Question and Explorations

There are a couple of problems to explore on helping to improve people's metacognition skills to make better financial decisions before going far into the research study. These are the types of questions to keep in mind as we continue with research and gathering more information with related work. The questions I have broken down to explore are the following:

1. How to improve a person's metacognitive skills to make better financial decisions using?
 - By developing questions and gathering feedback, and some content materials that allow learners to become motivated with curiosity, have a purpose, and encouragement to continuously to learn while promoting growth mindset, and providing features on the intelligent tutoring systems (ITS) to provide hints, monitoring, and the ability to self-regulate on their own process.
 - Students should be able to watch videos and learn by doing by learning how to calculate their debt and knowing how to budget, and test their knowledge after taking each lessons of the video.
2. How to involve the community at scale to develop everyone's metacognitive capabilities with the intelligent tutoring system?
 - By embedding a platform that is social with an educational theme, such as similar to Piazza, Slack, Peer Survey, and Facebook along with the content learning materials, questions, and tools for evaluating each and everyone's personal financial situation, which is contained inside the intelligent tutoring system (ITS).
 - The intelligent tutoring system (ITS) provides the guide for students to be able to interact and collaborate with one another on the platform, while have the benefit to providing and receiving feedbacks.
3. What the differences between learning with the intelligent tutoring systems versus interacting with peers and students in classroom settings?

- This will be discovered through surveys and feedbacks, and performing low-fidelity prototype along with the think-aloud protocol interviews to gather continuous feedback on design and the experiences they have when interacting with the intelligent tutoring system (ITS) being proposed. With all these research gathered and surveys created and distributed will provide me a solid understanding of the differences.

These are exploratory questions and thoughts to keep the reader at the back of the head as they discover possibilities to create the ITS platform to enhance one's metacognitive abilities for decision-making on personal finance. As we continue the research and discover more of these unknown answers to the questions, we might use some of ideas that is thought out above.

RELATED WORK

Based on my research, I was not able to find any intelligent tutoring systems (ITS) that focus on helping young adults to improve their metacognitive skills to make better decisions, but I was able to find related ITS platforms that help individuals hone young adults' metacognitive skills.



Figure 4: Carnegie Learning's Mika Software [2]

The ITS platforms I discovered was developed from the Carnegie Learning Team by Carnegie Mellon University, which is called the "Mika" software, which uses cognitive science and AI technologies and it creates personalized lesson plans and tutoring that adjust based on student's performance, and it provides real-time feedback.

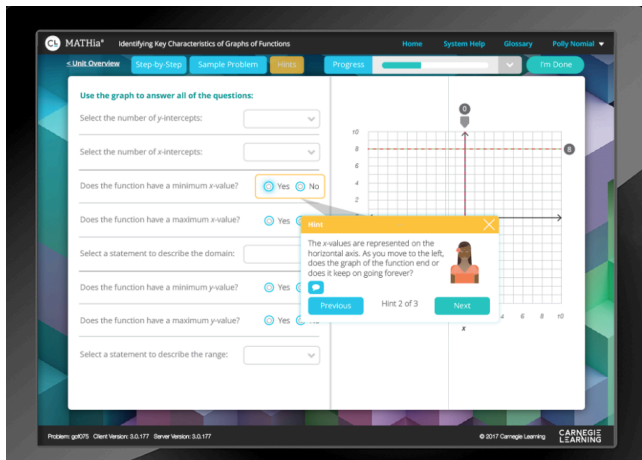


Figure 5: Carnegie Learning's MATHia [2].

There's also the Carnegie Learning's iTalk2Learn, which monitors students checking on their progress, emotional state and cognitive thoughts and processes when learning a subject, such as mathematics as an example.

These intelligent tutoring systems has the potential to create lifelong personalized learning platforms for students, and it can help keep us the constant changes of curriculum, and can help discover a better learning environment for students and young adults by monitoring and analyzing students' performance, as students are self-regulating their own performance and progress. Additionally, there's a "help-seeking" model, which is the idea of the metacognitive intelligent tutoring system (ITS) teaches the student how to seek for help if needed. The Carnegie Learning's Mika Software provides hints to point out to students to guide them to learn and take approaches. This model allows students to think on two different aspects:

1. Knowledge of knowledge, such as "Do I know enough to succeed on my own?"
2. Regulation of knowledge, which is "How can I obtain additional information that I may need?"

This sort of model can be utilized to help students to improve their metacognition to help improve financial decisions. The emphasis on the strategies and the objectives of learning to get students to become more self-aware of their metacognitive process can be integrated into the ITS. These entails thoughts and questions such as when the students go through the curriculum of personal finance of the ITS, what are the goals of this class session to be? And what do I really know about this topic of personal finance?

Given all the features and benefits from these existing ITS that Carnegie Learning have created, I'm planning to utilized and leveraged them from this project.

METHODOLOGY

There are a couple of elements that I use for this particular study and it has four aspects: online surveys, interviews, low-fidelity for think aloud protocols, and self-assessments.

The purpose of online surveys is to collect quantitative data to measure variables and to verify the existing hypothesis based on the motivation of this study. It is also used to generate new hypothesis for questions on the interview and the initiation of the low-fidelity prototype of think aloud protocol. The qualitative from the online surveys will be conducted via data analysis, and the qualitative data from the surveys will create observations, thoughts and ideas to generate new questions for a more in-depth type of personal interview to understand their thought process and the second set of survey is to gather additional information as a follow up. The quantitative and qualitative data that was formed from these surveys, and as well as the initial in-depth personal interviews lead to developing the initial low-fidelity prototype using the information and data that was gathered. The initial low-fidelity prototype is then use to conduct think aloud protocol interviews to gather information about people's psychology and thought processes regarding to interacting with the ITS for personal finance, and as well as gathering feedback for the prototype. The think aloud protocol interview will transition to distributing self-assessments for interviewees to evaluate and self-regulate their performance and their thoughts of the low-fidelity prototype and their think aloud experience, and as well as any additional feedbacks. Here is the breakdown of each element for this study:

Initial First Survey

The first round of the survey is to get a general understanding and identifying from my target audience in the sample community of fifty people in the OMSCS group. It gave me a good understanding of a variety of metacognitive approaches that came from the pool of fifty people, such as their level of understanding in personal finance, their age, their income, their spending level, and their overall financial situation they currently in. This set of data will use for quantitative data analysis and preparing the next set of questions for the second survey. This survey was conducted via peer survey from Georgia Tech.

Second Survey

The second round of the survey generally gathers partial quantitative but also qualitative data to get a general idea about people's approaches on managing their personal finances, and the type of tools or apps they have used or currently using, and how are they making financial decisions with the tools they're using. The purpose of this survey to understand their habits and their way of interacting financial tools as they're managing their finances, and integrate a similar way to the ITS so that they can stick to their existing habits that they're already used to or make it even more feasible for them to interact. In order to get a further in-depth if people's thought process, I

decided to conduct a in-person interview with 6 chosen candidates on the phone or video conference. This survey is also conducted via peer survey from Georgia Tech.

Interviews for In-Depth Qualitative Analysis

The interviews contain questions about specific scenarios and more of in-depth personal questions about the specific person. The idea is to get an understanding of their thinking process on the way they approach to personal finance, and their mindset and behavior around it. Based on their thought process, it can provide some insights on what it'd look like if they were to interact with the ITS that could better guide and help them to improve their metacognitive abilities to make better financial decisions for them. This interview is conducted via WebEx, Zoom, or phone calls with six chosen candidates from the pool of the fifty samples that lasted about fifteen to thirty minutes for each interviewee.

Low-Fidelity Prototype

Low-fidelity prototype is a quick and easy way to translate high-level design to something that is tangible and testable. It contains characteristics such as the visual design that is presentable, content of the design, and a human can simulate it interactively. It's quick to develop and is inexpensive that can be done via lucid chart.

Think aloud Interview Protocol

The think aloud protocol involves candidates to think out loud as they perform specific tasks as they interact with the low-fidelity prototype. They are asked to say what's in their mind as they perform the interaction. The idea is to understand their metacognitive process and the way they would approach their personal finance such as savings using the interface via the prototype. This is also conducted via WebEx, Zoom, or phone calls with five chosen candidates that lasted on an average of thirty minutes.

Self-Assessments

The self-assessment is generally conducted right after the think aloud interview and I would ask every candidates who completed a think aloud interview with me to complete a self-assessment with a set of given questions provided to them. The purpose of the self-assessment is to self-evaluate and regulate their performance and thinking process throughout the think aloud interview I have with them. It allows me to observe different measures of their progress on their metacognitive approaches as they evaluate and regulate their financial behaviors, and as well as any additional feedback they have for me on the low-fidelity prototypes or the questions that was given to them on the interview for the next iteration as the project continues.

RESULTS AND DISCUSSIONS

For the initial set of the research, I have constructed questions and answers received from the target audience and majority of young adults from the OMSCS group and reached out to the group on Piazza to complete the survey using Georgia Tech's Peer Survey. As a result, I have collected data from a pool of 50 people and these data sets were aggregated as preliminary data for quantitative

analysis via Excel. Here are a couple of data analyses that I find the most important:

What is your yearly income?

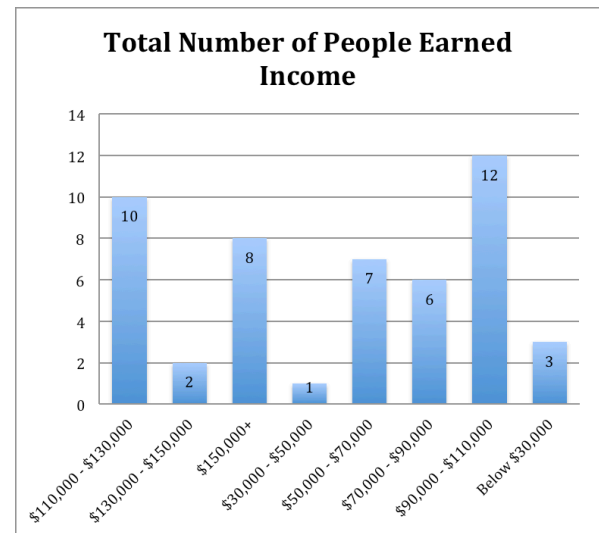


Figure 6: Number of People Earned Income.

Most of these people's yearly income is range from \$90 to \$130k, which is the average income for those who work in the technology industry, especially software engineers, in today's world. This isn't really that surprising. However, what's surprising is this following data set:

What is your yearly saving's rate?

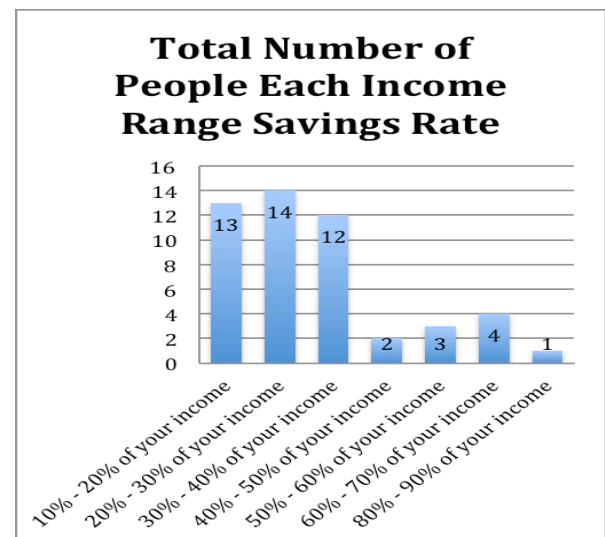


Figure 7: Number of People's Income Savings Rate.

Many of their saving's rate is range from 10%-40%, which is the bottom half of what they earn every year and according to research, the saving's rate is lower than what is expected to be able to reach their savings and retirement goals on time [3]. It's not just that their savings rate is low, their spending amount every month is high, which is about \$2,000 to \$3,500 every month and it hinders their savings

rate and their ability to meet their savings and retirement goals:

How much do you spend every single month?

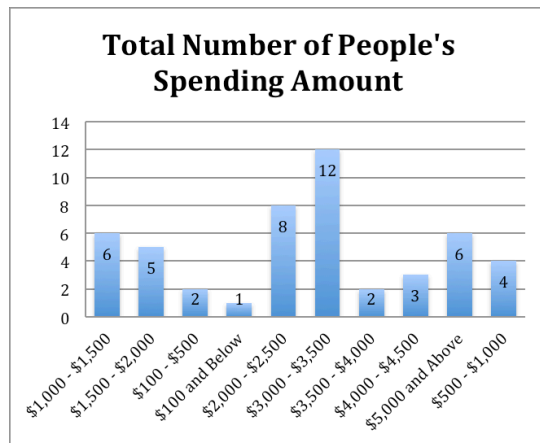


Figure 8: Number of People's Spending Amount.

Despite the financial challenges and struggles many are facing, they would love help from a financial coach or a financial advisor for help in variety of ways given by this data set:

How would you like help from a financial coach or advisor?

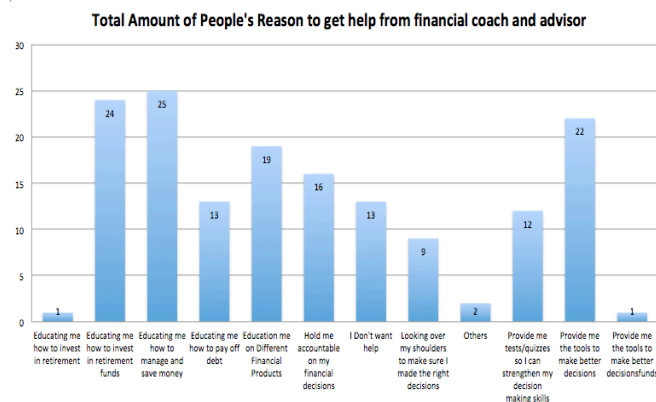


Figure 9: Number of People's Reasons for help from financial coach or advisor.

Many want help from a financial coach or advisor by educating them on how to manage and save money. Also, they want to have some form of education that teaches them the knowledge of investing and savings so that they can have more control and understanding of their finances.

In addition, those who are already tracking and managing their money would like to have more flexibility to control and manage their income, cash flow, investments, and savings all together because juggling multiple applications at once without any additional features and benefits has been a struggle that would like to put together.

What personal financial tools you use to track and manage your finances?

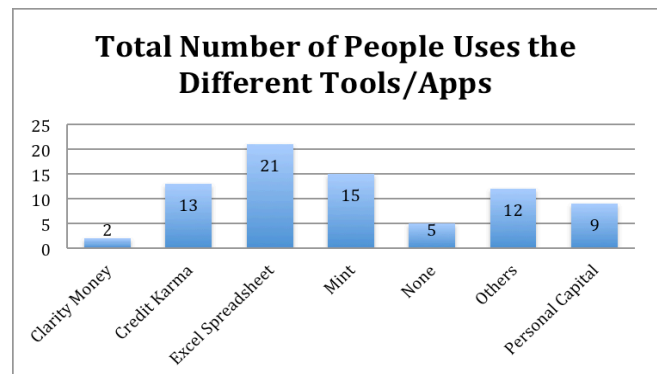


Figure 9: Number of People that uses different tools and applications to manage their finances.

Majority of them uses the Excel Spreadsheet, Credit Karma and Mint to manage their finances, but what would we're able to integrate all of those similar tools to an ITS? I went on to conduct a more in-depth 1-on-1 interviews with individuals of six candidates using these following seven questions:

1. When is the first thing that comes to your mind regarding to savings and invest?
2. What does your saving process looks like?
3. What is your process of spending your money?
4. What is your process of tracking your finance?
5. What is your process of investing?
6. How disciplined are you with your savings and Investing approach? (Scale 1 – 5)
7. Do you feel like having an accountability partner, financial coach or advisor would be helpful for your financial success? In what way?

With the questions above, here is the list of common answers I received the most from the pool of candidates:

- Have a lack of prior knowledge and doesn't know how to start, and don't have time for it.
- Don't have higher risk tolerance
- Some like automating their savings into different accounts.
- Have problems with micro saving and budgeting, such as food and groceries and they wish they could budget and save better.
- Needs the education on how to save and budget better
- Wants a system to provide them notification that they have spent a certain amount of money per week and can't go back their budget

Based on the research and analysis, since many struggles with managing and saving money the most, I decided to construct a low-fidelity prototype on savings, with the flexibility to view different graphs and charts in different

angels for students as they interact with the ITS based on the following flow:

Low-Fidelity Prototype on Intelligent Tutoring System (ITS) for Savings:

Figure 9: First lesson on “Understanding the Psychology Behind Savings”.

Figure 10: Second Lesson on “Step-By-Step to Budgeting and Savings.

Figure 11: Quiz on the Savings' Lessons.

Figure 12: Personal Saving's Plan

Figure 13: Financial Performance and Recommendations

Using these low-fidelity prototypes, I have conducted think aloud interviews with five chosen candidates from the OMSCS program and friends from outside of the program. The experience varies based on their background, thought process and their own personal experience. The idea is to understand their metacognitive process and the way they would approach their savings using the interface via the prototype. Here's a list of six questionnaires that I generally asked to five candidates during think aloud interview but may vary and adjusted based on the person's background:

1. Let say you want to save money, can you walk me through your thought process of interacting with this interface?
2. Let say you want to learn to save and the step-by-step guide to savings?
3. What if you want to test your knowledge of what you just learned?
4. What if you want a roadmap that guides you through your savings plan by weeks, months, and years?
5. What if you want to track your own financial performances?

6. What if you need to help and/or need to ask the intelligent tutoring system (ITS) questions?

According to the questions above, here a list of common answers I received from the five interviewees:

- Noticed the videos from the lessons but it is vague and confusing since there are no context in the videos.
- The quiz is confusing and has thrown off by not understanding the purpose of the quiz, and don't know if it meant to quiz their knowledge based on the video of it is a survey, and neither they know whether or not they are being scored.
- The description of the words on the prototype can mislead and cause confusion, especially linking accounts.
- The financial performance screen is nice but has potential to put additional features or a change of the view on graphs to analyze their performance differently.
- The recommendations on performances can provide something to improve on and something to look forward to allow users to keep on using the ITS.
- The length of the video lessons is unknown and still questionable since they don't know what to expect from the videos.

After the think aloud interviews, I went ahead to have each and every interviewees to self-assess their performance and experience with me on the phone or a conference call. The idea is to allow them to self-regulate and evaluate their thinking process when interacting the interface and as well as any feedbacks they have from the prototype throughout the think aloud. Here is the list of six questions I generally asked for the self-assessment:

1. Do you think this interface will give you the flexibility to learn and keep your savings in progress?
2. Do you think this flow will help you to acquire the knowledge and skillset on your savings?
3. Do you think the UI is simple to follow for you to self-manage?
4. How do you think having an intelligent tutoring system (ITS) will be helpful for you in the long term? If so, in what way it can help change your financial behavior?
5. Do you think this will help you to regulate your own savings behavior from time to time?
6. Any feedbacks you have on the visual layout?

Based on the answers it was given by questions above, here is the list of common answers I received for the feedbacks on the visual layout and their metacognitive process:

- Include a history of performance for them to look forward to as they continuously use the ITS, and it

also allows them to track their past performance, which motivates them to improve and aim higher.

- The note taking is nice to have but they wouldn't use it because they rather take notes on a piece of paper or on other mediums.
- The icon to ask the ITS for help can be adjusted to a question mark since those two icons are repetitive, and when hove over to provide information of what this question (?) mark is about and guide user on how to take action.
- Instead of having a quiz tab, provide a questionnaire tab that allows user to answer their own questions about their financial behavior and background that can be utilized to adjust their plans and goals accordingly
- The videos are the critical player because the content is what's important to set up the user's mind to approach their financial behavior
- The plan of tracking one's savings can be weekly, daily, monthly, or yearly as a drop down that allows people to choose based on their preferences and needs.

The preliminary data and feedbacks from the think aloud interviews have been the most valuable I received throughout this research study and will be utilized and revisit on the next iteration as a continuous research and development.

CONCLUSION

Starting from the metrics above from preliminary data that was analyzed, there are three conclusions that I can draw from: the average young adults are saving less than the targeted amount that they should be saving to meet their goals, they are spending more than they should in respect to their yearly income of an average of \$110K - \$130K, and they need help on educating and learning to manage and save money. With these conclusions, I constructed a low-fidelity prototype to help people to improve their savings behavior by discovering their metacognitive approaches as if they were interacting with the ITS interface for savings.

Furthermore, the personal financial ITS is simply and easy to follow but has a lot of potential for improvements and adjustments to meet users' needs and goals, as there are multiple confusions that have come across. The education part is heavily depending on the content of the videos in order to help the users. Some adjustments on the UI can provide more value to keep users to continuously use the ITS, such as tracking past performance, provide personable questionnaires on their financial behavior instead of quizzes, and give flexibility for users to interact with the interface based on personal preferences and goals. It also interesting to see that the feedback that came across from five interviewees from this think aloud came out to be really positive and encouraging for additional feedback that can make adjustments on the next iterations.

POTENTIAL FUTURE WORK

Based on the feedbacks and results, for the potential of future work I'm interested to see how the feedback changes as this can move forward to the next interactions of the prototype. For the next iteration of prototype, we can adjust the graphs and charts into a progress bar for the performance to represent how far through the user has been performing, and it will ultimately motivate the person to do better. This will provide a better quality metacognitive feedback based on these adjustments.

In addition, it's also a good idea to enhance the content and the videos for each of the screens on the UI that can provide more information for the user to understand it much better. Instead of having a quiz for the lessons, we can have a personal questionnaire for people to answer so that we can understand their behavior much better since each individual's background and behavior is unique.

Then, we can move forward into the development phase to see the actually functional product so that we can make progress on actually making it work for the user to test on since the feedback has been really positive on the potential that it is in this ITS for personal finance on savings.

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REFERENCES

1. Antonietti, A., Borsetto, A., Iannello, P. (March 25, 2016). "A Metacognitive Approach to Financial Literacy" (Page 57-68). International Handbook of Financial Literacy. Retrieved from https://link.springer.com/chapter/10.1007/978-981-10-0360-8_5
2. Carnegielearning.com. (2017). [Online] Available at: <https://www.carnegielearning.com/products/software-platform/mathia-learning-software/>
3. 5paisa.com (Feb 2018). Top 5 financial issues that young adults face today. Article. Retrieved from <https://www.5paisa.com/articles/top-5-financial-issues-that-young-adults-face-today>
4. Kuntz, Rachel (2011). "Metacognition: The importance of learning about learning". Knewton. Retrieved from <https://www.knewton.com/resources/blog/ed-tech-101/ed-tech-101-metacognition/>
5. Shim, Soyeon, Barber L., Bonnie, Card A., Noel, Xiao, Jing Jian, Serido, Joyce (April 2009). Financial Socialization of First-year college students: The roles of parents, work, and education. Empirical Research. Springer Science and Business Media, LLC. Retrieved from <https://link.springer.com/content/pdf/10.1007%2Fs10964-009-9432-x.pdf>
6. The Organization for Economic Co-Operation and Development (2012). Financial Education in Schools [Pamphlet]. International Network on Financial Education. Retrieved from https://www.oecd.org/daf/fin/financialeducation/FinEdSchool_web.pdf
7. Way, Wendy L., Holden, Karen (March 2009). Teacher's Background and Capacity to teach personal finance: result of a national study. National Endowment for Financial Education. Retrieved from https://www.nefe.org/Portals/0/WhatWeProvide/PrimaryResearch/PDF/TNTSalon_FinalReport.pdf